DIPLOMADO DE PROFUNDIZACIÓN CISCO

PRUEBA DE HABILIDADES PRACTICAS CCNP

KIMBERLY ARCILA NIEVA

UNIVERSIDAD NACIONAL ABIERTA Y A DISTANCIA – UNAD

ESCUELA DE CIENCIAS BÁSICAS, TECNOLOGÍA E INGENIERÍA – ECBTI

INGENIERÍA ELECTRÓNICA

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KIMBERLY ARCILA NIEVA

Diplomado de opción de grado presentado para optar el título
de INGENIERA EN ELECTRONICA

DIRECTOR:
MSc. GERARDO GRANADOS ACUÑA

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NOTA DE ACEPTACIÓN

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Firma del Presidente del Jurado

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Firma del Jurado

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Firma del Jurado

Buga, 12 de diciembre del 2019

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Primero darle gracias a Dios por llenarme de bendiciones y fortaleza para continuar en este proceso de poder culminar con éxito una etapa más de la vida y a mi familia especialmente a mi madre por haber sido mi pilar a lo largo de toda mi carrera universitaria y a lo largo de mi vida. Gracias a todas las personas especiales que me acompañaron en esta etapa, aportando a mi formación tanto profesional y como de crecimiento humano.

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RESUMEN

En la siguiente prueba de habilidades se plantean dos escenarios relacionados con diferentes aspectos de Networking, en el primer escenario una empresa de confecciones posee tres sucursales distribuidas en las ciudades de Bogotá, Medellín y Bucaramanga, se deberá configurar e interconectar entre sí cada uno de los dispositivos que forman parte del escenario, acorde con los lineamientos establecidos para el direccionamiento IP, protocolos de enrutamiento y demás aspectos que forman parte de la topología de red.

En el segundo escenario una empresa de comunicaciones presenta una estructura Core acorde a la topología de red, se deberá configurar e interconectar entre sí cada uno de los dispositivos que forman parte del escenario, acorde con los lineamientos establecidos para el direccionamiento IP, etherchannels, VLANs y demás aspectos que forman parte del escenario propuesto.

Palabras clave: CISCO, routers, Swuitch, Redes.

ABSTRACT

In the following skills test, two scenarios related to different aspects of Networking are proposed, in the first scenario a garment company has three branches distributed in the cities of Bogotá, Medellín and Bucaramanga, each of them must be configured and interconnected devices that are part of the scenario, in accordance with the guidelines established for IP addressing, routing protocols and other aspects that are part of the network topology.
In the second scenario, a communications company presents a Core structure according to the network topology, each of the devices that are part of the scenario must be configured and interconnected, in accordance with the guidelines established for IP addressing, etherchannels, VLANs and other aspects that are part of the proposed scenario.

Keywords: CISCO, routers, Swuitch, Networks.

INTRODUCCIÓN

Este trabajo escrito se realiza para dar cumplimiento al objetivo de habilidades practicas del diplomado de profundización en redes Cisco Networking, y de la misma forma como trabajo de grado para obtener el título de ingeniero electrónico de la prestigiosa universidad Nacional Abierta y a distancia UNAD.

Trabajaremos sobre dos topologías de redes con diferentes exigencias de conexión y condiciones de implementación, las cuales quedaran plasmadas en este escrito, por medio de la simulación en el software GSN3, el cual está diseñado para el trabajo de redes con router's y switches de la tecnología Cisco.

DESARROLLO

ESCENARIO 1

Una empresa de confecciones posee tres sucursales distribuidas en las ciudades de Bogotá, Medellín y Bucaramanga, en donde el estudiante será el administrador de la red, el cual deberá configurar e interconectar entre sí cada uno de los dispositivos que forman parte del escenario, acorde con los lineamientos establecidos para el direccionamiento IP, protocolos de enrutamiento y demás aspectos que forman parte de la topología de red.

Figura 1. Escenario 1

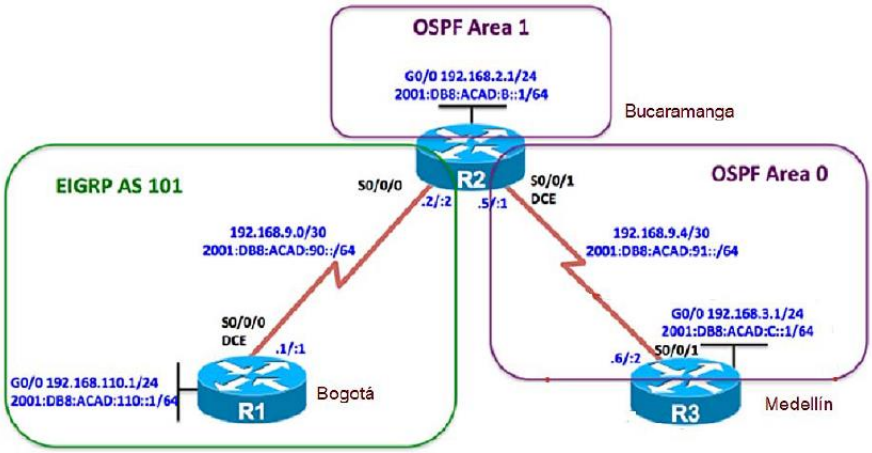
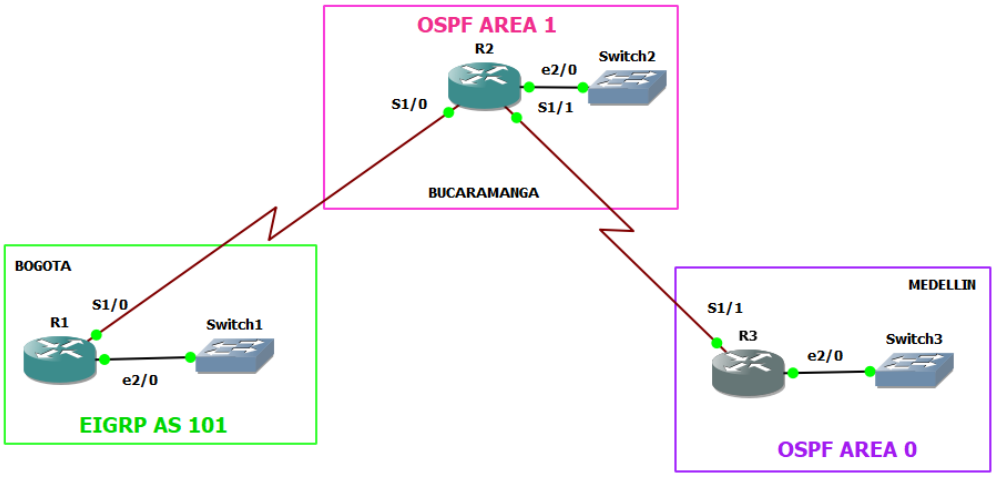


Figura 2. Simulación de escenario 1



Parte 1: Configuración del escenario propuesto

1. Configurar las interfaces con las direcciones IPv4 e IPv6 que se muestran en la topología de red.

Se procede a configurar cada una de las direcciones de los tres routers en base a la topología que nos suministra el tutor.

Router R1

```
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#no ip domain-lookup
R1(config)#hostname R1
R1(config)#ipv6 unicast-routing
R1(config)#line con 0
R1(config-line)#logging synchronous
R1(config-line)#exec-timeout 0 0
R1(config-line)#exit
R1(config)#interface e2/0
R1(config-if)#ip address 192.168.110.1 255.255.255.0
R1(config-if)#ipv6 address 2001:db8:acad:110::1/64
R1(config-if)#no shut
R1(config-if)#exit
R1(config)#interface s1/0
R1(config-if)#ip address 192.168.9.1 255.255.255.252
R1(config-if)#ipv6 address 2001:db8:acad:90::1/64
R1(config-if)#ipv6 address fe80::1 link-local
```

Router R2

```
R2#Conf t
Enter configuration commands, one per line.  End with CNTL/Z.
```

```
R2(config)#ipv6 unicast-routing
R2(config)#no ip domain-lookup
R2(config)#line con 0
R2(config-line)#logging synchronous
R2(config-line)#exec-timeout 0 0
R2(config-line)#interface s1/0
R2(config-if)#ip address 192.168.9.2 255.255.255.252
R2(config-if)#ipv6 address 2001:db8:acad:90::2/64
R2(config-if)#ipv6 address fe80::2 link-local
R2(config-if)#no shut
R2(config-if)#exit
R2(config)#interface s1/1
R2(config-if)#ip address 192.168.9.5 255.255.255.252
R2(config-if)#ipv6 address 2001:db8:acad:91::1/64
R2(config-if)#ipv6 address fe80::2 link-local
R2(config-if)#clock rate 128000
R2(config-if)#no shut
R2(config-if)#exit
R2(config)#interface e2/0
R2(config-if)#ip address 192.168.2.1 255.255.255.0
R2(config-if)#ipv6 address 2001:db8:acad:b::1/64
R2(config-if)#no shut
R2(config-if)#exit
```

Router R3

```
R3#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#ipv6 unicast-routing
R3(config)#no ip domain-lookup
R3(config)#line con 0
R3(config-line)#logging synchronous
```

```
R3(config-line)#exec-timeout 0 0
R3(config-line)#exit
R3(config)#interface s1/1
R3(config-if)#ip address 192.168.9.6 255.255.255.252
R3(config-if)#ipv6 address 2001:db8:acad:91::2/64
R3(config-if)#ipv6 address fe80::3 link-local
R3(config-if)#no shutdown
R3(config-if)#exit
R3(config)#interface e2/0
R3(config-if)#ip address 192.168.3.1 255.255.255.0
R3(config-if)#ipv6 address 2001:db8:acad:c::1/64
R3(config-if)#no shutdown
R3(config-if)#exit
```

2. Ajustar el ancho de banda a 128 kbps sobre cada uno de los enlaces seriales ubicados en R1, R2, y R3 y ajustar la velocidad de reloj de las conexiones de DCE según sea apropiado.

Router R1

```
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#interface s1/0
R1(config-if)#bandwidth 128
R1(config-if)#clock rate 128000
R1(config-if)#no shut
```

Router R2

```
R2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#interface s1/0
```

R2(config-if)#bandwidth 128
R2(config-if)#no shut
R2(config-if)#exit
R2(config)#interface s1/1
R2(config-if)#bandwidth 128
R2(config-if)#clock rate 128000
R2(config-if)#no shut
R2(config-if)#exit

Router R3

R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#interface s1/1
R3(config-if)#bandwidth 128
R3(config-if)#no shut
R3(config-if)#exit

3. En R2 y R3 configurar las familias de direcciones OSPFv3 para IPv4 e Ipv6. Utilice el identificador de enrutamiento 2.2.2.2 en R2 y 3.3.3.3 en R3 para ambas familias de direcciones.

Router R2

R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#router ospfv3 1
R2(config-router)#address-family ipv4 unicast
R2(config-router-af)#router-id 2.2.2.2
R2(config-router-af)#exit-address-family
R2(config-router)#address-family ipv6 unicast
R2(config-router-af)#router-id 2.2.2.2
R2(config-router-af)#exit-address-family

Router R3

```
R3#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#router ospfv3 1
R3(config-router)#address-family ipv4 unicast
R3(config-router-af)#router-id 3.3.3.3
R3(config-router-af)#passive-interface e2/0
R3(config-router-af)#default-information originate always
R3(config-router-af)#exit-address-family
R3(config-router)#address-family ipv6 unicast
R3(config-router-af)#router-id 3.3.3.3
R3(config-router-af)#passive-interface e2/0
R3(config-router-af)#default-information originate always
R3(config-router-af)#exit-address-family
```

4. En R2, configurar la interfaz F0/0 en el área 1 de OSPF y la conexión serial entre R2 y R3 en OSPF área 0.

```
R2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#interface e2/0
R2(config-if)#ospfv3 1 ipv4 area 1
R2(config-if)#ospfv3 1 ipv6 area 1
R2(config-if)#exit
R2(config)#interface s1/1
R2(config-if)#ospfv3 1 ipv4 area 0
R2(config-if)#ospfv3 1 ipv6 area 0
R2(config-if)#exit
```

5. En R3, configurar la interfaz F0/0 y la conexión serial entre R2 y R3 en OSPF área 0.

```
R3#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#interface e2/0
R3(config-if)#ospfv3 1 ipv4 area 1
R3(config-if)#ospfv3 1 ipv6 area 1
R3(config-if)#exit
R3(config)#interface s1/1
R3(config-if)#ospfv3 1 ipv4 area 0
R3(config-if)#ospfv3 1 ipv6 area 0
R3(config-if)#exit
```

6. Configurar el área 1 como un área totalmente Stubby.

Router R2

```
R2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#router ospfv3 1
R2(config-router)#address-family ipv4 unicast
R2(config-router-af)#area 1 stub no-summary
R2(config-router-af)#exit-address-family
R2(config-router)#address-family ipv6 unicast
R2(config-router-af)#area 1 stub no-summary
R2(config-router-af)#exit-address-family
```

7. Propagar rutas por defecto de Ipv4 y Ipv6 en R3 al interior del dominio OSPFv3. Nota: Es importante tener en cuenta que una ruta por defecto es diferente a la definición de rutas estáticas.

Router R3

```
R3#conf t
```

Enter configuration commands, one per line. End with CNTL/Z.

R3(config)#router ospfv3 1

R3(config-router)#address-family ipv4 unicast

R3(config-router-af)#default-information originate always

R3(config-router-af)#exit-address-family

R3(config-router)#address-family ipv6 unicast

R3(config-router-af)#default-information originate always

R3(config-router-af)#exit-address-family

8. Realizar la configuración del protocolo EIGRP para Ipv4 como Ipv6. Configurar la interfaz F0/0 de R1 y la conexión entre R1 y R2 para EIGRP con el sistema autónomo 101. Asegúrese de que el resumen automático está desactivado.

Router R1

R1#conf t

Enter configuration commands, one per line. End with CNTL/Z.

R1(config)#router eigrp DUAL-STACK

R1(config-router)#address-family ipv4 unicast autonomous-system 101

R1(config-router-af)#af-interface e2/0

R1(config-router-af-interface)#passive-interface

R1(config-router-af-interface)#exit-af-interface

R1(config-router-af)#topology base

R1(config-router-af-topology)#exit-af-topology

R1(config-router-af)#network 192.168.9.0 0.0.0.3

R1(config-router-af)#network 192.168.110.0 0.0.0.255

R1(config-router-af)#eigrp router-id 1.1.1.1

R1(config-router-af)#exit-address-family

R1(config-router)#address-family ipv6 unicast autonomous-system 101

R1(config-router-af)#af-interface e2/0

R1(config-router-af-interface)#passive-interface

R1(config-router-af-interface)#exit-af-interface

```
R1(config-router-af)#topology base
R1(config-router-af-topology)#exit-af-topology
R1(config-router-af)#eigrp router-id 1.1.1.1
R1(config-router-af)#exit-address-family
```

9. Configurar las interfaces pasivas para EIGRP según sea apropiado.

```
R2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#router ospfv3 1
R2(config-router)#address-family ipv4 unicast
R2(config-router-af)#area 1 stub no-summary
R2(config-router-af)#exit-address-family
R2(config-router)#address-family ipv6 unicast
R2(config-router-af)#area 1 stub no-summary
R2(config-router-af)#exit-address-family
R2(config-router)#router eigrp dual-stack
R2(config-router)#address-family ipv4 unicast autonomous-system 4
R2(config-router-af)#network 192.168.9.0 0.0.0.3
R2(config-router-af)#eigrp router-id 2.2.2.2
R2(config-router-af)#exit-address-family
R2(config-router)#address-family ipv6 unicast autonomous-system 6
R2(config-router-af)#af-interface e2/0
R2(config-router-af-interface)#shutdown
R2(config-router-af-interface)#exit-af-interface
R2(config-router-af)#af-interface s1/1
R2(config-router-af-interface)#shutdown
R2(config-router-af-interface)#exit-af-interface
R2(config-router-af)#eigrp router-id 2.2.2.2
R2(config-router-af)#exit-address-family
```

10. En R2, configurar la redistribución mutua entre OSPF y EIGRP para Ipv4 e Ipv6. Asignar métricas apropiadas cuando sea necesario.

```
R2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#router eigrp DUAL-STACK
R2(config-router)#address-family ipv4 unicast autonomous-system 101
R2(config-router-af)#topology base
R2(config-router-af-topology)#distribute-list 1 out
R2(config-router-af-topology)#distribute-list R3-to-R1 out
R2(config-router-af-topology)#$e ospfv3 1 metric 1500 100 255 1 1500
R2(config-router-af-topology)#exit-af-topology
R2(config-router-af)#address-family ipv6 unicast autonomous-system 101
R2(config-router-af)#topology base
R2(config-router-af-topology)#redistribute ospf 1 metric 1500 100 255 1 1500
R2(config-router-af-topology)#exit-af-topology
R2(config-router-af)#exit
```

11. En R2, de hacer publicidad de la ruta 192.168.3.0/24 a R1 mediante una lista de distribución y ACL.

```
R2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#router eigrp dual-stack
R2(config-router)#address-family ipv4 unicast autonomous-system 4
R2(config-router-af)#topology base
R2(config-router-af-topology)#redistribute ospfv3
R2(config-router-af-topology)#exit-af-topology
R2(config-router-af)#address-family ipv6 unicast autonomous-system 6
R2(config-router-af)#topology base
R2(config-router-af-topology)#$e ospf 1 metric 10000 100 255 1 1500
R2(config-router-af-topology)#exit-af-topology
```

R2(config-router-af)#exit

R2(config-router)#exit

R2(config)#ip 20ccess-list standard r3-to-r1

R2(config-std-nacl)#remark acl to filter 192.168.3.0/24

R2(config-std-nacl)#deny 192.168.3.0 0.0.0.255

R2(config-std-nacl)#permit any

Parte 2: Verificar conectividad de red y control de la trayectoria

a. Registrar las tablas de enrutamiento en cada uno de los routers, acorde con los parámetros de configuración establecidos en el escenario propuesto.

Router R1

Figura 3. Tabla de enrutamiento de R1

```
R1#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
       + - replicated route, % - next hop override

Gateway of last resort is not set

      192.168.9.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.9.0/30 is directly connected, Serial1/0
L        192.168.9.1/32 is directly connected, Serial1/0
      192.168.110.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.110.0/24 is directly connected, Ethernet2/0
L        192.168.110.1/32 is directly connected, Ethernet2/0
```

Figura 4. Tabla de enrutamiento de R1

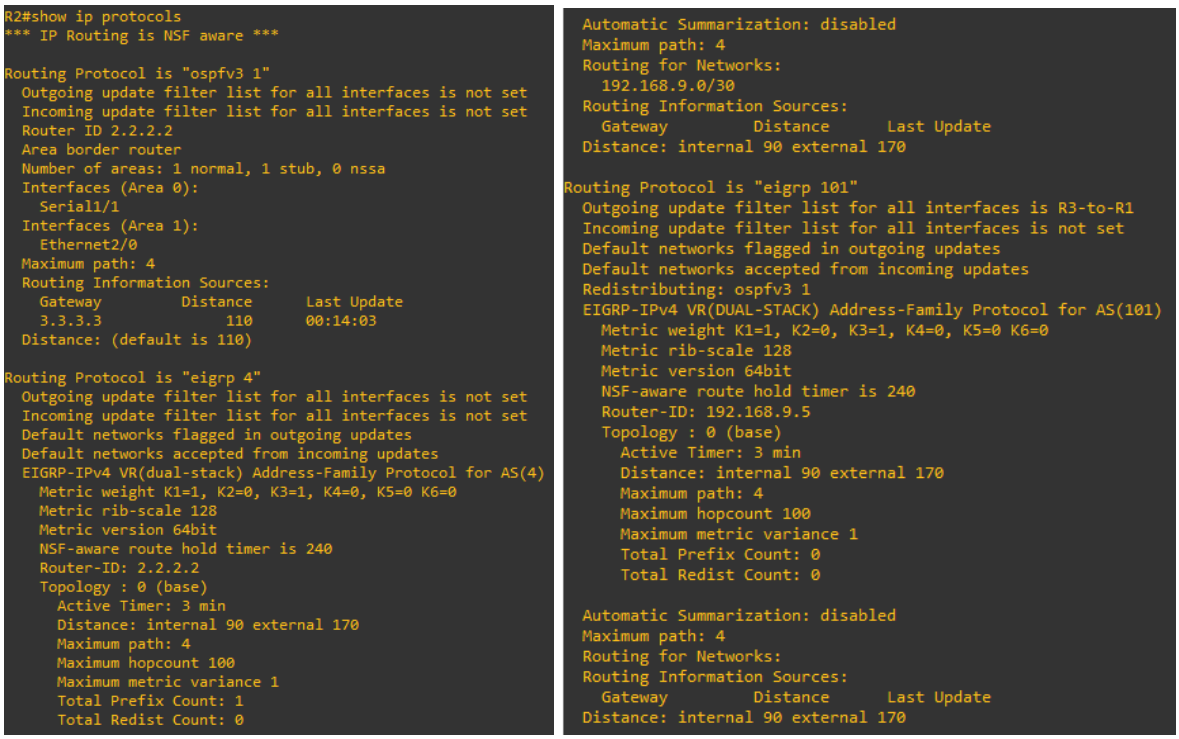
```
R1#show ip protocols
*** IP Routing is NSF aware ***

Routing Protocol is "eigrp 101"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Default networks flagged in outgoing updates
  Default networks accepted from incoming updates
  EIGRP-IPv4 VR(DUAL-STACK) Address-Family Protocol for AS(101)
    Metric weight K1=1, K2=0, K3=1, K4=0, K5=0 K6=0
    Metric rib-scale 128
    Metric version 64bit
    NSF-aware route hold timer is 240
    Router-ID: 1.1.1.1
    Topology : 0 (base)
      Active Timer: 3 min
      Distance: internal 90 external 170
      Maximum path: 4
      Maximum hopcount 100
      Maximum metric variance 1
      Total Prefix Count: 2
      Total Redist Count: 0

  Automatic Summarization: disabled
  Maximum path: 4
  Routing for Networks:
    192.168.9.0/30
    192.168.110.0
  Passive Interface(s):
    Ethernet2/0
  Routing Information Sources:
    Gateway         Distance      Last Update
  Distance: internal 90 external 170
```

Router R2

Figura 5. Tabla de enrutamiento de R2

```
R2#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
       + - replicated route, % - next hop override

Gateway of last resort is 192.168.9.6 to network 0.0.0.0

O*E2  0.0.0.0/0 [110/1] via 192.168.9.6, 00:13:23, Serial1/1
      192.168.2.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.2.0/24 is directly connected, Ethernet2/0
L        192.168.2.1/32 is directly connected, Ethernet2/0
O IA  192.168.3.0/24 [110/791] via 192.168.9.6, 00:13:23, Serial1/1
      192.168.9.0/24 is variably subnetted, 4 subnets, 2 masks
C        192.168.9.0/30 is directly connected, Serial1/0
L        192.168.9.2/32 is directly connected, Serial1/0
C        192.168.9.4/30 is directly connected, Serial1/1
L        192.168.9.5/32 is directly connected, Serial1/1
```

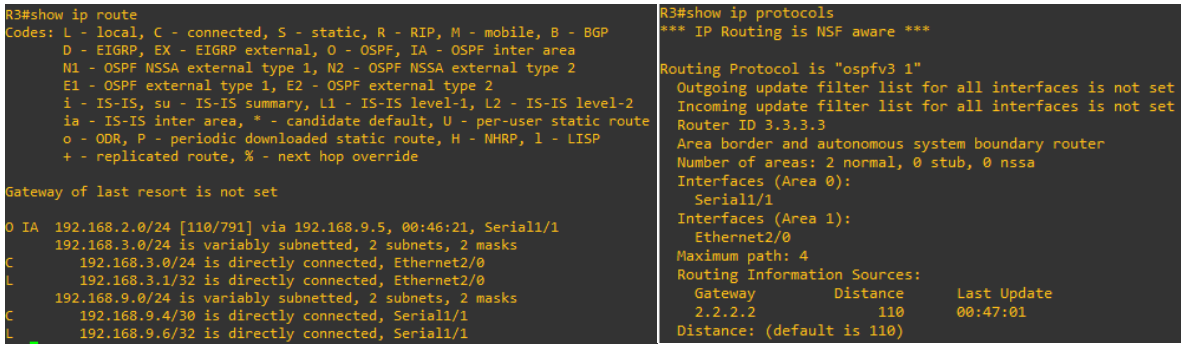
Figura 6. Tabla de enrutamiento de R3



```
R2#show ip protocols
*** IP Routing is NSF aware ***

Routing Protocol is "ospfv3 1"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 2.2.2.2
  Area border router
  Number of areas: 1 normal, 1 stub, 0 nssa
  Interfaces (Area 0):
    Serial1/1
  Interfaces (Area 1):
    Ethernet2/0
  Maximum path: 4
  Routing Information Sources:
    Gateway         Distance      Last Update
    3.3.3.3              110      00:14:03
  Distance: (default is 110)

Routing Protocol is "eigrp 4"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Default networks flagged in outgoing updates
  Default networks accepted from incoming updates
  EIGRP-IPv4 VR(dual-stack) Address-Family Protocol for AS(4)
    Metric weight K1=1, K2=0, K3=1, K4=0, K5=0 K6=0
    Metric rib-scale 128
    Metric version 64bit
    NSF-aware route hold timer is 240
    Router-ID: 2.2.2.2
    Topology : 0 (base)
      Active Timer: 3 min
      Distance: internal 90 external 170
      Maximum path: 4
      Maximum hopcount 100
      Maximum metric variance 1
      Total Prefix Count: 1
      Total Redist Count: 0

  Automatic Summarization: disabled
  Maximum path: 4
  Routing for Networks:
    192.168.9.0/30
  Routing Information Sources:
    Gateway         Distance      Last Update
  Distance: internal 90 external 170

Routing Protocol is "eigrp 101"
  Outgoing update filter list for all interfaces is R3-to-R1
  Incoming update filter list for all interfaces is not set
  Default networks flagged in outgoing updates
  Default networks accepted from incoming updates
  Redistributing: ospfv3 1
  EIGRP-IPv4 VR(DUAL-STACK) Address-Family Protocol for AS(101)
    Metric weight K1=1, K2=0, K3=1, K4=0, K5=0 K6=0
    Metric rib-scale 128
    Metric version 64bit
    NSF-aware route hold timer is 240
    Router-ID: 192.168.9.5
    Topology : 0 (base)
      Active Timer: 3 min
      Distance: internal 90 external 170
      Maximum path: 4
      Maximum hopcount 100
      Maximum metric variance 1
      Total Prefix Count: 0
      Total Redist Count: 0

  Automatic Summarization: disabled
  Maximum path: 4
  Routing for Networks:
  Routing Information Sources:
    Gateway         Distance      Last Update
  Distance: internal 90 external 170
```

Router R3

Figure 7. Tabla de enrutamiento de R3



```
R3#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
       + - replicated route, % - next hop override

Gateway of last resort is not set

O IA  192.168.2.0/24 [110/791] via 192.168.9.5, 00:46:21, Serial1/1
      192.168.3.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.3.0/24 is directly connected, Ethernet2/0
L        192.168.3.1/32 is directly connected, Ethernet2/0
      192.168.9.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.9.4/30 is directly connected, Serial1/1
L        192.168.9.6/32 is directly connected, Serial1/1
```

```
R3#show ip protocols
*** IP Routing is NSF aware ***

Routing Protocol is "ospfv3 1"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 3.3.3.3
  Area border and autonomous system boundary router
  Number of areas: 2 normal, 0 stub, 0 nssa
  Interfaces (Area 0):
    Serial1/1
  Interfaces (Area 1):
    Ethernet2/0
  Maximum path: 4
  Routing Information Sources:
    Gateway         Distance      Last Update
    2.2.2.2              110      00:47:01
  Distance: (default is 110)
```

b. Verificar comunicación entre routers mediante el comando ping y traceroute

Router R1

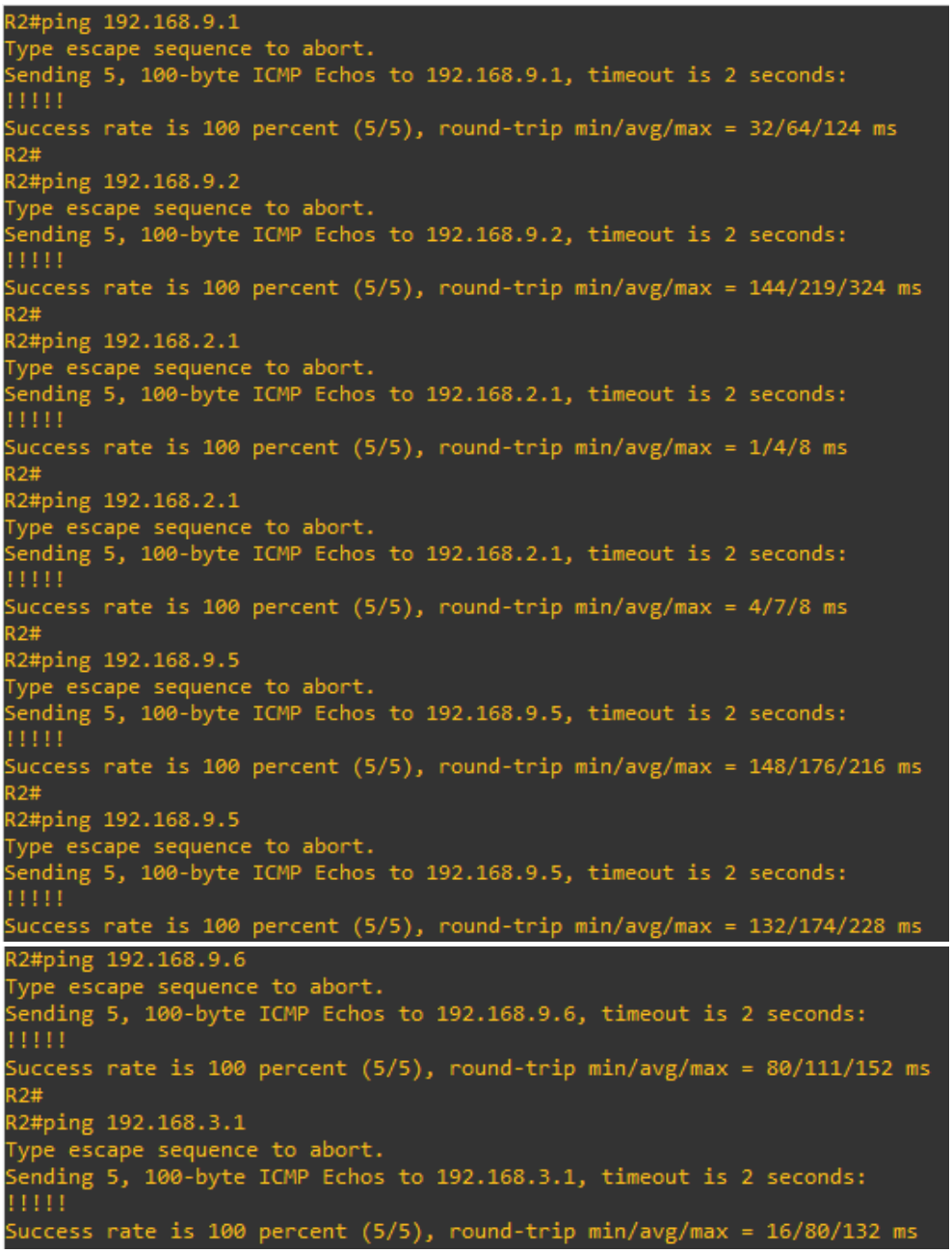
Figure 8. Verificación de comunicación R1

```
R1#ping 192.168.110.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.110.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/6/8 ms
R1#
R1#ping 192.168.9.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.9.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 84/234/320 ms
R1#
R1#ping 192.168.9.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.9.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/78/184 ms
```

```
R1#ping 2001:db8:acad:110::1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:ACAD:110::1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/4 ms
R1#
R1#ping 2001:db8:acad:90::1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:ACAD:90::1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/1 ms
R1#
R1#ping 2001:db8:acad:90::2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:ACAD:90::2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 56/71/120 ms
```

Router R2

Figure 9. Verificación de comunicación R2



```
R2#ping 192.168.9.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.9.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 32/64/124 ms
R2#
R2#ping 192.168.9.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.9.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 144/219/324 ms
R2#
R2#ping 192.168.2.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.2.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/4/8 ms
R2#
R2#ping 192.168.2.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.2.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/7/8 ms
R2#
R2#ping 192.168.9.5
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.9.5, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 148/176/216 ms
R2#
R2#ping 192.168.9.5
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.9.5, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 132/174/228 ms
R2#ping 192.168.9.6
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.9.6, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 80/111/152 ms
R2#
R2#ping 192.168.3.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.3.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 16/80/132 ms
```

Figure 10. Verificación de comunicación R2

```
R2#ping 2001:db8:acad:110::1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:ACAD:110::1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 72/109/216 ms
R2#
R2#ping 2001:db8:acad:90::1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:ACAD:90::1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 48/111/184 ms
R2#
R2#ping 2001:db8:acad:90::2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:ACAD:90::2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/1 ms
R2#ping 2001:db8:acad:91::1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:ACAD:91::1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/4/4 ms
R2#
R2#ping 2001:db8:acad:1::1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:ACAD:1::1, timeout is 2 seconds:
UUUUU
Success rate is 0 percent (0/5)
R2#
R2#ping 2001:db8:acad:c::1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:ACAD:C::1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 72/112/148 ms
```

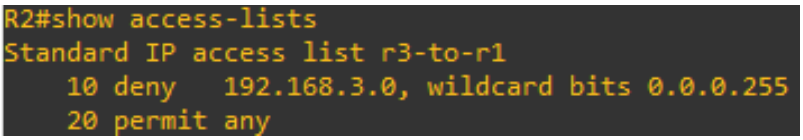
Router R3

Figure 11. Verificación de comunicación R3

```
R3#ping 192.168.2.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.2.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 48/120/196 ms
R3#
R3#ping 192.168.2.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.2.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 60/89/108 ms
R3#
R3#ping 192.168.9.5
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.9.5, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 44/102/140 ms
R3#
R3#ping 192.168.9.5
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.9.5, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 64/126/212 ms
R3#
R3#ping 192.168.9.6
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.9.6, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 160/217/264 ms
R3#
R3##ping 192.168.3.1
R3#ping 192.168.3.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.3.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/7/8 ms
R3#ping 2001:db8:acad:b::1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:ACAD:B::1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 76/149/280 ms
R3#
R3#ping 2001:db8:acad:91::1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:ACAD:91::1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/47/144 ms
R3#
R3#
R3#ping 2001:db8:acad:c::1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:ACAD:C::1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/4 ms
```

c. Verificar que las rutas filtradas no están presentes en las tablas de enrutamiento de los routers correctas.

Figure 12. Verificación de las rutas filtradas



ESCENARIO 2

Una empresa de comunicaciones presenta una estructura Core acorde a la topología de red, en donde el estudiante será el administrador de la red, el cual deberá configurar e interconectar entre sí cada uno de los dispositivos que forman parte del escenario, acorde con los lineamientos establecidos para el direccionamiento IP, etherchannels, VLANs y demás aspectos que forman parte del escenario propuesto.

Figure 13. Escenario 2

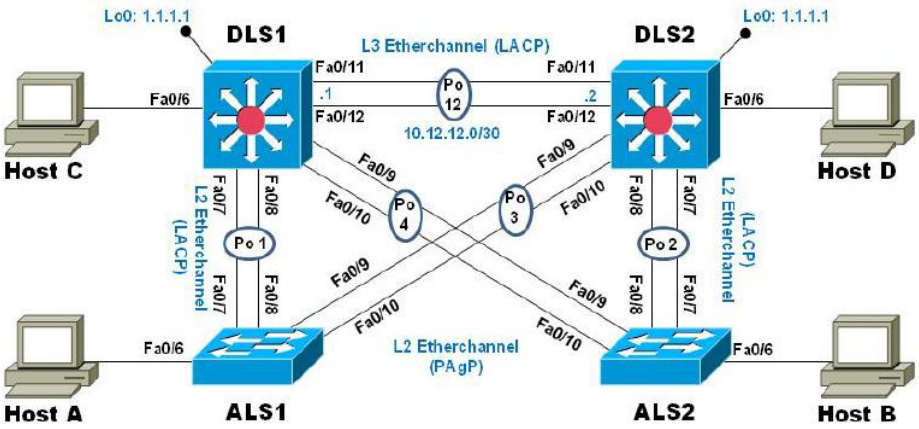
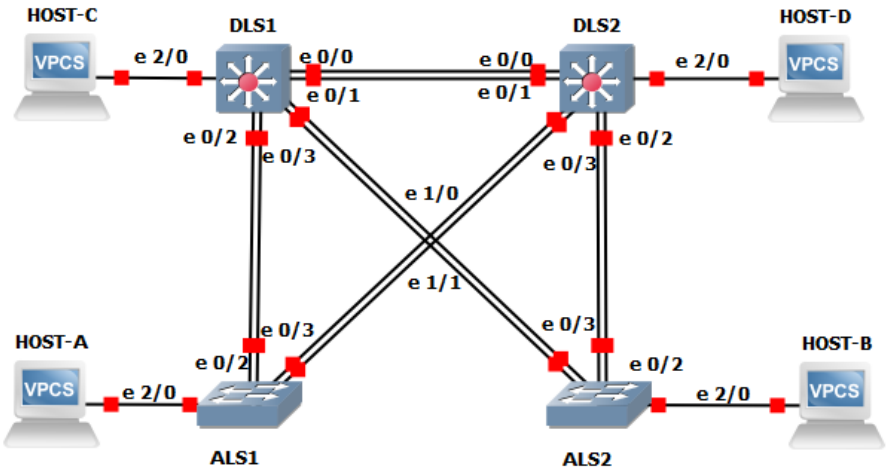


Figure 14. Simulación del escenario 2



Parte 1: Configurar la red de acuerdo con las especificaciones

a. Apagar todas las interfaces en cada switch.

Switch DLS1

```
DLS1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
DLS1(config)#int ran e0/0-3, e1/0-1, e2/0
DLS1(config-if-range)#shutdown
DLS1(config-if-range)#exit
```

Switch DLS2

```
DLS2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
DLS2(config)#int ran e0/0-3, e1/0-1, e2/0
DLS2(config-if-range)#shutdown
DLS2(config-if-range)#exit
```

Switch ALS1

```
ALS1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
ALS1(config)#int ran e0/2-3, e1/0-1, e2/0
ALS1(config-if-range)#shutdown
ALS1(config-if-range)#exit
```

Switch ALS2

```
ALS2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
```

```
ALS2(config)#int ran e0/2-3, e1/0-1, e2/0
ALS2(config-if-range)#shutdown
ALS2(config-if-range)#exit
```

b. Asignar un nombre a cada switch acorde al escenario establecido.

Switch DLS1

```
DLS1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
DLS1(config)#hostname DLS1
DLS1(config)#exit
```

Switch DLS2

```
DLS2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
DLS2(config)#hostname DLS2
DLS2(config)#exit
```

Switch ALS1

```
ALS1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
ALS1(config)#hostname ALS1
ALS1(config)#exit
```

Switch ALS2

```
ALS2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
ALS2(config)#hostname ALS2
```

ALS2(config)#exit

c. Configurar los puertos troncales y Port-channels tal como se muestra en el diagrama.

1) La conexión entre DLS1 y DLS2 será un EtherChannel capa-3 utilizando LACP. Para DLS1 se utilizará la dirección IP 10.12.12.1/30 y para DLS2 utilizará 10.12.12.2/30.

2) Los Port-channels en las interfaces Fa0/7 y Fa0/8 utilizarán LACP.

3) Los Port-channels en las interfaces F0/9 y fa0/10 utilizará PAgP.

4) Todos los puertos troncales serán asignados a la VLAN 800 como la VLAN nativa.

Switch DLS1

DLS1#conf t

Enter configuration commands, one per line. End with CNTL/Z.

DLS1(config)#int ran e0/0-1

DLS1(config-if-range)#no switchport

DLS1(config-if-range)#channel-group 12 mode active

DLS1(config-if-range)#no shut

DLS1(config-if-range)#exit

DLS1(config)#interface port-channel 12

DLS1(config-if)#ip address 10.12.12.1 255.255.255.252

DLS1(config-if)#exit

DLS1(config)#int ran e0/2-3, e1/0-1

DLS1(config-if-range)#switchport trunk encapsulation dot1q

DLS1(config-if-range)#switchport trunk native vlan 800

DLS1(config-if-range)#switchport mode trunk

DLS1(config-if-range)#switchport nonegotiate

DLS1(config-if-range)#no shut

DLS1(config-if-range)#exit

DLS1(config)#int ran e0/2-3

DLS1(config-if-range)#desc member of po1 to ALS1
DLS1(config-if-range)#channel-group 1 mode active
DLS1(config-if-range)#exit int ran e1/0-1
DLS1(config)#int ran e1/0-1
DLS1(config-if-range)#desc member of po4 to ALS2
DLS1(config-if-range)#channel-group 4 mode desirable
Creating a port-channel interface Port-channel 4
DLS1(config-if-range)#exit

Switch DLS2

DLS2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
DLS2(config)#int ran e0/0-1
DLS2(config-if-range)#no switchport
DLS2(config-if-range)#channel-group 12 mode active
DLS2(config-if-range)#no shut
DLS2(config-if-range)#exit
DLS2(config)#interface port-channel 12
DLS2(config-if)#ip address 10.12.12.2 255.255.255.252
DLS2(config-if)#exit
DLS2(config)#int ran e0/2-3, e1/0-1
DLS2(config-if-range)#switchport trunk encapsulation dot1q
DLS2(config-if-range)#switchport trunk native vlan 800
DLS2(config-if-range)#switchport mode trunk
DLS2(config-if-range)#switchport nonegotiate
DLS2(config-if-range)#no shut
DLS2(config-if-range)#exit
DLS2(config)#int ran e0/2-3
DLS2(config-if-range)#desc member of po1 to ALS2
DLS2(config-if-range)#channel-group 1 mode active
DLS2(config-if-range)#exit

DLS2(config)#int ran e1/0-1
DLS2(config-if-range)#desc member of po4 to ALS1
DLS2(config-if-range)#channel-group 4 mode desirable
DLS2(config-if-range)#exit

Switch ALS1

ALS1(config)#int ran e0/2-3, e1/0-1
ALS1(config-if-range)#switchport trunk native vlan 800
ALS1(config-if-range)#switchport mode trunk
ALS1(config-if-range)#switchport nonegotiate
ALS1(config-if-range)#no shut
ALS1(config-if-range)#exit
ALS1(config)#int ran e0/2-3
ALS1(config-if-range)#desc member of po1 to DLS1
ALS1(config-if-range)#channel-group 1 mode active
ALS1(config-if-range)# switchport trunk allowed vlan
12,123,234,800,1010,1111,3456
ALS1(config-if-range)#no shut
ALS1(config-if-range)#exit
ALS1(config)#int ran e1/0-1
ALS1(config-if-range)#desc member of po 3 to DLS2
ALS1(config-if-range)#channel-group 3 mode desirable
ALS1(config-if-range)# switchport trunk allowed vlan
12,123,234,800,1010,1111,3456
ALS1(config-if-range)#no shut
ALS1(config-if-range)#exit
ALS1(config)#int vlan 3456
ALS1(config-if)#ip address 10.34.56.101 255.255.255.0
ALS1(config-if)#no shut
ALS1(config-if)#exit
ALS1(config)#ip default-gateway 10.34.56.254

Switch ALS2

ALS2#conf t
Enter configuration commands, one per line. End with CNTL/Z.

```
ALS2(config)#int ran e0/2-3, e1/0-1
ALS2(config-if-range)#switchport trunk native vlan 800
ALS2(config-if-range)#switchport mode trunk
ALS2(config-if-range)#switchport nonegotiate
ALS2(config-if-range)#exit
ALS2(config)#int ran e0/2-3, e1/0-1
ALS2(config-if-range)#switchport trunk native vlan 800
ALS2(config-if-range)#switchport mode trunk
ALS2(config-if-range)#switchport nonegotiate
ALS2(config-if-range)#exit
ALS2(config)#int ran e0/2-3
ALS2(config-if-range)#desc member of po2 to DLS2
ALS2(config-if-range)#channel-group 2 mode active
ALS2(config-if-range)# switchport trunk allowed vlan
12,123,234,800,1010,1111,3456
ALS2(config-if-range)#no shut
ALS2(config-if-range)#exit
ALS2(config)#int ran e1/0-1
ALS2(config-if-range)#desc member of po 4 to DLS1
ALS2(config-if-range)#channel-group 4 mode desirable
ALS2(config-if-range)# switchport trunk allowed vlan
12,123,234,800,1010,1111,3456
ALS2(config-if-range)#no shut
ALS2(config-if-range)#exit
ALS2(config)#int vlan 3456
ALS2(config-if)#ip add 10.34.56.102 255.255.255.0
ALS2(config-if)#no shut
ALS2(config-if)#exit
ALS2(config)#ip default-gateway 10.34.56.254
```

d. Configurar DLS1, ALS1, y ALS2 para utilizar VTP versión 3

1) Utilizar el nombre de dominio UNAD con la contraseña cisco123

2) Configurar DLS1 como servidor principal para las VLAN.

3) Configurar ALS1 y ALS2 como clientes VTP.

Switch DLS1

DLS1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
DLS1(config)#vtp domain UNAD
DLS1(config)#vtp ver 3
DLS1(config)#vtp password cisco123
DLS1(config)#vtp primary vlan

Switch ALS1

ALS1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
ALS1(config)#vtp domain UNAD
ALS1(config)#vtp ver 3
ALS1(config)#vtp mode client
ALS1(config)#vtp password cisco123

Switch ALS2

ALS2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
ALS2(config)#vtp domain UNAD
ALS2(config)#vtp ver 3
ALS2(config)#vtp mode client
ALS2(config)#vtp password cisco123

e. Configurar en el servidor principal las siguientes VLAN:

Tabla 1. Configuración de VLAN del servidor principal

Número de VLAN	Nombre de VLAN	Número de VLAN	Nombre de VLAN
800	NATIVA	434	ESTACIONAMIENTO
12	EJECUTIVOS	123	MANTENIMIENTO
234	HUESPEDES	1010	VOZ
1111	VIDEONET	3456	ADMINISTRACIÓN

```
DLS1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
DLS1(config)#vlan 800
DLS1(config-vlan)#name NATIVA
DLS1(config-vlan)#exit
DLS1(config)#vlan 434
DLS1(config-vlan)#name ESTACIONAMIENTO
DLS1(config-vlan)#exit
DLS1(config)#vlan 12
DLS1(config-vlan)#name EJECUTIVOS
DLS1(config-vlan)#exit
DLS1(config)#vlan 123
DLS1(config-vlan)#name MANTENIMIENTO
DLS1(config-vlan)#exit
DLS1(config)#vlan 234
DLS1(config-vlan)#name HUESPEDES
DLS1(config-vlan)#exit
DLS1(config)#vlan 1010
DLS1(config-vlan)#name VOZ
DLS1(config-vlan)#exit
DLS1(config)#vlan 1111
DLS1(config-vlan)#name VIDEONET
DLS1(config-vlan)#exit
DLS1(config)#vlan 3456
DLS1(config-vlan)#name ADMINISTRACION
```

f. En DLS1, suspender la VLAN 434.

```
DLS1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
DLS1(config)#vlan 434
DLS1(config-vlan)#state suspend
DLS1(config-vlan)#exit
```

g. Configurar DLS2 en modo VTP transparente VTP utilizando VTP versión 2, y configurar en DLS2 las mismas VLAN que en DLS1.

```
DLS2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
DLS2(config)#vtp ver 2
DLS2(config)#vtp mode transparent
Setting device to VTP Transparent mode for VLANS.
DLS2(config)#vlan 800
DLS2(config-vlan)#name NATIVA
DLS2(config-vlan)#exit
DLS2(config)#vlan 434
DLS2(config-vlan)#name ESTACIONAMIENTO
DLS2(config-vlan)#exit
DLS2(config)#vlan 12
DLS2(config-vlan)#name EJECUTIVOS
DLS2(config-vlan)#exit
DLS2(config)#vlan 123
DLS2(config-vlan)#name MANTENIMIENTO
DLS2(config-vlan)#exit
DLS2(config)#vlan 234
DLS2(config-vlan)#name HUESPEDES
DLS2(config-vlan)#exit
DLS2(config)#vlan 1010
DLS2(config-vlan)#name VOZ
DLS2(config-vlan)#exit
DLS2(config)#vlan 1111
DLS2(config-vlan)#name VIDEONET
DLS2(config-vlan)#exit
DLS2(config)#vlan 3456
DLS2(config-vlan)#name ADMINISTRACION
```

h. Suspender VLAN 434 en DLS2.

```
DLS2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
DLS2(config)#vlan 434
DLS2(config-vlan)#state suspend
DLS2(config-vlan)#exit
```

i. En DLS2, crear VLAN 567 con el nombre de CONTABILIDAD. La VLAN de CONTABILIDAD no podrá estar disponible en cualquier otro Switch de la red.

DLS2#conf t

Enter configuration commands, one per line. End with CNTL/Z.

DLS2(config)#vlan 567

DLS2(config-vlan)#name CONTABILIDAD

DLS2(config-vlan)#exit

j. Configurar DLS1 como Spanning tree root para las VLAN 1, 12, 434, 800, 1010, 1111 y 3456 y como raíz secundaria para las VLAN 123 y 234.

DLS1#conf t

Enter configuration commands, one per line. End with CNTL/Z.

DLS1(config)#spanning-tree vlan 1,12,434,800,1010,1111,3456 root primary

DLS1(config)#spanning-tree vlan 123,234 root secondary

k. Configurar DLS2 como Spanning tree root para las VLAN 123 y 234 y como una raíz secundaria para las VLAN 12, 434, 800, 1010, 1111 y 3456.

DLS2#conf t

Enter configuration commands, one per line. End with CNTL/Z.

DLS2(config)#spanning-tree vlan 123,234 root primary

DLS2(config)#spanning-tree vlan 1,12 ,434,800,1010,3456 root secondary

l. Configurar todos los puertos como troncales de tal forma que solamente las VLAN que se han creado se les permitirá circular a través de éstos puertos.

Switch DLS1

DLS1#conf t

Enter configuration commands, one per line. End with CNTL/Z.

DLS1(config)#interface port-channel 1

DLS1(config-if)#switchport trunk allowed vlan 12,123,234,800,1010,1111,3456
DLS1(config-if)#exit
DLS1(config)#interface port-channel 4
DLS1(config-if)#switchport trunk allowed vlan 12,123,234,800,1010,1111,3456
DLS1(config-if)#exit

Switch DLS2

DLS2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
DLS2(config)#interface port-channel 2
DLS2(config-if)#switchport trunk allowed vlan 12,123,234,800,1010,1111,3456
Command rejected: Po2 is not a switching port.
DLS2(config-if)#exit
DLS2(config)#interface port-channel 3
DLS2(config-if)#switchport trunk allowed vlan 12,123,234,800,1010,1111,3456
DLS2(config-if)#exit

m. Configurar las siguientes interfaces como puertos de acceso, asignados a las VLAN de la siguiente manera:

Tabla 2. Configuración de interfaces como puertos de acceso

Interfaz	DLS1	DLS2	ALS1	ALS2
Interfaz Fa0/6	3456	12 , 1010	123, 1010	234
Interfaz Fa0/15	1111	1111	1111	1111
Interfaces F0 /16-18		567		

Part 2: conectividad de red de prueba y las opciones configuradas

a. Verificar la existencia de las VLAN correctas en todos los switches y la asignación de puertos troncales y de acceso

Switch DLS1

Figure 15. Verificación de VLAN en DLS1

```
DLS1#show vlan brief

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Et1/2, Et1/3, Et2/0, Et2/1
                                                Et2/2, Et2/3, Et3/0, Et3/1
                                                Et3/2, Et3/3
12   EJECUTIVOS                       active
123  MANTENIMIENTO                    active
234  HUESPEDES                        active
434  ESTACIONAMIENTO                  suspended
800  NATIVA                           active
1002 fddi-default                     act/unsup
1003 trcrf-default                    act/unsup
1004 fddinet-default                  act/unsup
1005 trbrf-default                    act/unsup
1010 VOZ                              active
1111 VIDEONET                         active
3456 ADMINISTRACION                   active
```

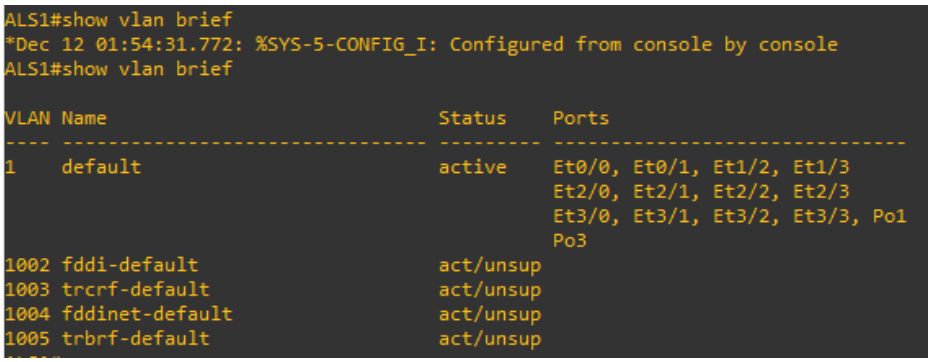
Switch DLS2

Figure 16. Verificación de VLAN en DLS2

```
DLS2#show vlan brief

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Et0/3, Et1/2, Et1/3, Et2/0
                                                Et2/1, Et2/2, Et2/3, Et3/0
                                                Et3/1, Et3/2, Et3/3, Po4
12   EJECUTIVOS                       active
123  MANTENIMIENTO                    active
234  HUESPEDES                        active
434  ESTACIONAMIENTO                  suspended
567  CONTABILIDAD                     active
800  NATIVA                           active
1002 fddi-default                     act/unsup
1003 trcrf-default                    act/unsup
1004 fddinet-default                  act/unsup
1005 trbrf-default                    act/unsup
1111 VIDEONET                         active
3456 ADMINISTRACION                   active
```

Switch ALS1

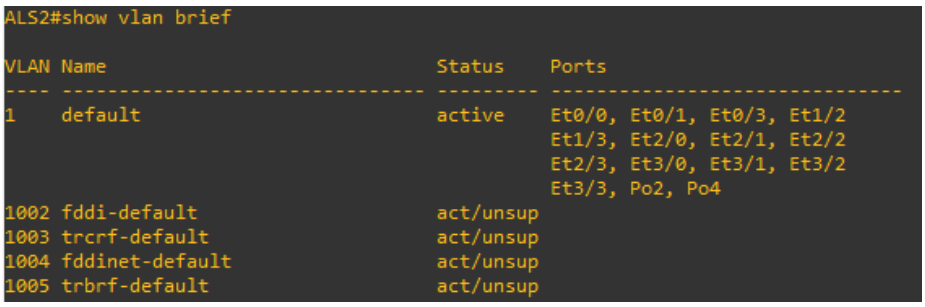
Figure 17. Verificación de VLAN en ALS1



```
ALS1#show vlan brief
*Dec 12 01:54:31.772: %SYS-5-CONFIG_I: Configured from console by console
ALS1#show vlan brief

VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    Et0/0, Et0/1, Et1/2, Et1/3
                                                 Et2/0, Et2/1, Et2/2, Et2/3
                                                 Et3/0, Et3/1, Et3/2, Et3/3, Po1
                                                 Po3
1002 fddi-default                      act/unsup
1003 trcrf-default                     act/unsup
1004 fddinet-default                   act/unsup
1005 trbrf-default                     act/unsup
```

Switch ALS2

Figure 18. Verificación de VLAN en ALS2

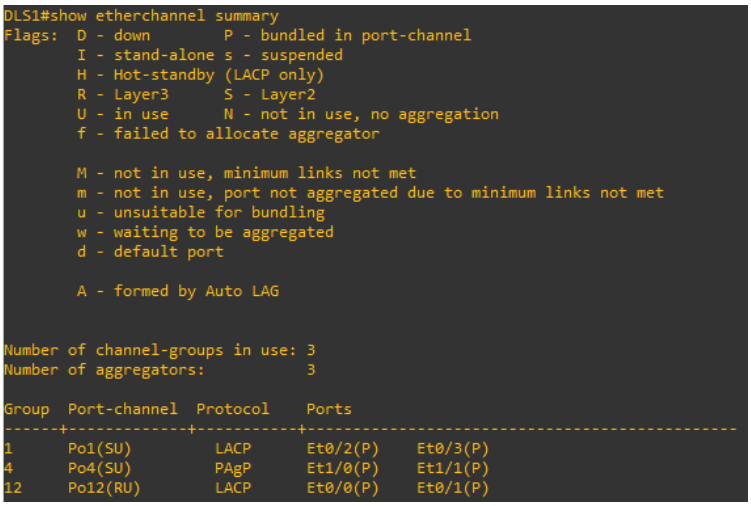


```
ALS2#show vlan brief

VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    Et0/0, Et0/1, Et0/3, Et1/2
                                                 Et1/3, Et2/0, Et2/1, Et2/2
                                                 Et2/3, Et3/0, Et3/1, Et3/2
                                                 Et3/3, Po2, Po4
1002 fddi-default                      act/unsup
1003 trcrf-default                     act/unsup
1004 fddinet-default                   act/unsup
1005 trbrf-default                     act/unsup
```

b. Verificar que el EtherChannel entre DLS1 y ALS1 está configurado correctamente

Switch DLS1

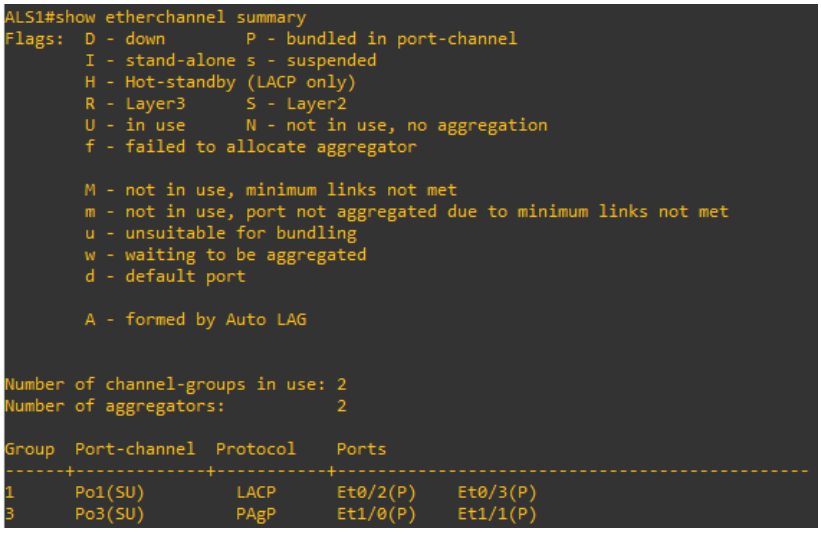
Figure 19. Verificación de EtherChannel en DSL1



```
DLS1#show etherchannel summary
Flags:  D - down        P - bundled in port-channel
        I - stand-alone s - suspended
        H - Hot-standby (LACP only)
        R - Layer3      S - Layer2
        U - in use      N - not in use, no aggregation
        f - failed to allocate aggregator

        M - not in use, minimum links not met
        m - not in use, port not aggregated due to minimum links not met
        u - unsuitable for bundling
        w - waiting to be aggregated
        d - default port

        A - formed by Auto LAG


Number of channel-groups in use: 3
Number of aggregators:           3

Group  Port-channel  Protocol    Ports
------+-------------+-----------+-----------------------------------------------
1      Po1(SU)         LACP      Et0/2(P)    Et0/3(P)
4      Po4(SU)         PAgP      Et1/0(P)    Et1/1(P)
12     Po12(RU)        LACP      Et0/0(P)    Et0/1(P)
```

Switch ALS1

Figure 20. Verificación de EtherChannel en ASL1

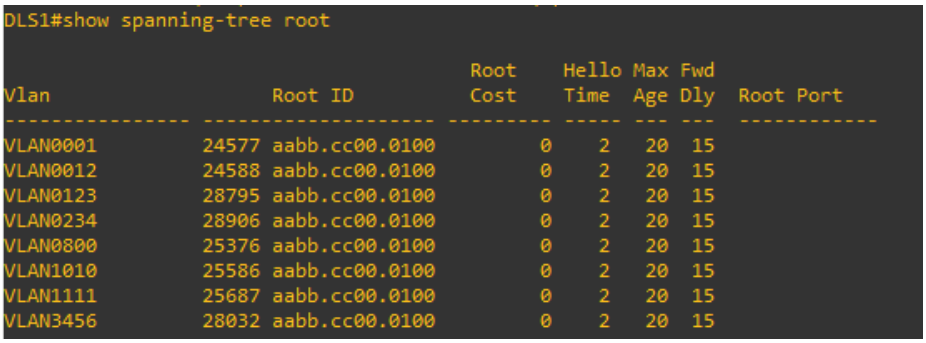


```
ALS1#show etherchannel summary
Flags:  D - down        P - bundled in port-channel
        I - stand-alone s - suspended
        H - Hot-standby (LACP only)
        R - Layer3      S - Layer2
        U - in use      N - not in use, no aggregation
        f - failed to allocate aggregator

        M - not in use, minimum links not met
        m - not in use, port not aggregated due to minimum links not met
        u - unsuitable for bundling
        w - waiting to be aggregated
        d - default port

        A - formed by Auto LAG


Number of channel-groups in use: 2
Number of aggregators:           2

Group  Port-channel  Protocol    Ports
------+-------------+-----------+-----------------------------------------------
1      Po1(SU)         LACP      Et0/2(P)    Et0/3(P)
3      Po3(SU)         PAgP      Et1/0(P)    Et1/1(P)
```

c. Verificar la configuración de Spanning tree entre DLS1 o DLS2 para cada VLAN.

Switch DLS1

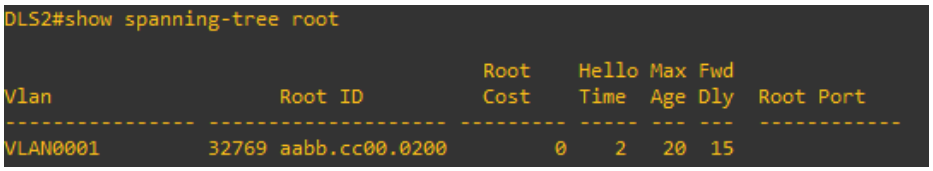
Figure 21. Verificación de la configuración de Spanning tree en DLS1



```
DLS1#show spanning-tree root

                                        Root    Hello Max Fwd
Vlan                Root ID             Cost    Time  Age Dly  Root Port
---------------- ------------------- --------- ----- --- ---  ------------
VLAN0001         24577 aabb.cc00.0100         0    2   20  15
VLAN0012         24588 aabb.cc00.0100         0    2   20  15
VLAN0123         28795 aabb.cc00.0100         0    2   20  15
VLAN0234         28906 aabb.cc00.0100         0    2   20  15
VLAN0800         25376 aabb.cc00.0100         0    2   20  15
VLAN1010         25586 aabb.cc00.0100         0    2   20  15
VLAN1111         25687 aabb.cc00.0100         0    2   20  15
VLAN3456         28032 aabb.cc00.0100         0    2   20  15
```

Switch DLS2

Figure 22. Verificación de la configuración de Spanning tree en DLS2



```
DLS2#show spanning-tree root

                                        Root    Hello Max Fwd
Vlan                Root ID             Cost    Time  Age Dly  Root Port
---------------- ------------------- --------- ----- --- ---  ------------
VLAN0001         32769 aabb.cc00.0200         0    2   20  15
```

CONCLUSIONES

Por medio del diplomado de profundización se adquirieron conocimientos sobre la configuración de Routing y Switching en la tecnología de redes CISCO, los cuales fueron aplicados en el desarrollo de esta actividad.

Se utiliza el software GNS3 para desarrollar los dos escenarios propuestos en esta actividad, se introdujeron diferentes comandos en los routers y switches dependiendo de los protocolos y sus direcciones ipv4 e ipv6.

Mediante los comandos show se verifico que los protocolos se han realizado correctamente y mediante los comandos ping que tenga conectividad entre los diferentes dispositivos.

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